Purpose and Need for Proposed Action

for

Project 1440-13/15-00
WIS 23 (Fond du Lac - Plymouth)
Fond du Lac and Sheboygan Counties

PURPOSE AND NEED FOR PROPOSED ACTION

INTRODUCTION

The Wisconsin Department of Transportation (WisDOT), in consultation with the Federal Highway Administration (FHWA), is studying alternatives for providing additional highway capacity on WIS 23, located in east-central Wisconsin, between the Cities of Fond du Lac and Plymouth, in Fond du Lac and Sheboygan Counties, respectively. The majority of existing WIS 23 is a rural two-lane highway. Portions of the highway, on either end of the project, are located in growing urban areas. The study for highway capacity expansion begins at County K, on the east side of the City of Fond du Lac, about ½ mile east of the future US 151/WIS 23 interchange. The existing roadway extends approximately 19 miles east to County P on the northwest side of the City of Plymouth. The portion of WIS 23 from County P to WIS 67 in Plymouth is being expanded to four lanes in 2004 and 2005. WIS 23 from WIS 67 to I-43 in Sheboygan was previously expanded to four-lanes. This leaves the Fond du Lac to Plymouth section as the last remaining two-lane segment between Fond du Lac and I-43 in Sheboygan. (See location map, Figure 1, page I-10).

PROJECT PURPOSE

The purpose of the proposed action is to provide additional highway capacity, serving existing and projected traffic volumes and to improve operational efficiency and safety for local and through traffic on the corridor while minimizing environmental impacts. Objectives for the proposed action on WIS 23 are:

- Preserve the corridor for future transportation needs by coordinating local governmental land use plans in a planning study. Proper planning will help alleviate development pressures on WIS 23 while addressing environmental issues for the future highway project.
- Provide a safe and dependable highway connection to and from regional communities while reducing conflicts between local and through traffic.
- Improve the highway facility to meet current design standards for this connector route in Wisconsin.
- Provide system continuity between the City of Sheboygan and the City of Fond du Lac. WIS 23 is the only major east-west connecting highway between these and other population centers of east-central Wisconsin
- Improve safety at intersections and farm crossings.
- Increase the mobility by adding capacity and minimizing public and private access.
- Improve the operational efficiency of the WIS 23 corridor, appropriate for the highway's function as a connector route in east-central Wisconsin, promoting regional and statewide economic development.
- Maintain a rural highway type facility while addressing the increased traffic needs of the expanding urban area.

PROJECT NEED

The WIS 23 corridor study will determine how to best meet the long-term transportation needs of the highway. The proposed transportation facility should fulfill the following objectives and address the following deficiencies.

System Linkage and Route Importance

WIS 23 is included in Wisconsin's part of the National Highway System (NHS) as designated under the 1998 *Transportation Equity Act for the 21st Century* (TEA21). NHS routes serve major population centers, inter-modal transportation facilities and major travel destinations, and provide connections to the national defense highway network. WIS 23 provides the only NHS east-west link between Milwaukee (to the south) and Appleton (to the north).

WIS 23 is a designated state long truck route. This designation further demonstrates its importance to commercial and economic development interests within the state. Trucks account for approximately 14 percent of the average daily traffic using the highway.

WIS 23 is identified in the Corridors 2020 Plan as a connector route. (See Corridors 2020 map, Figure 2, page I-10). As a connector highway within this network, existing WIS 23 is a major link between Sheboygan and Fond du Lac, and connects the backbone routes of I-43 and US 41. These highways connect Sheboygan and Fond du Lac to other population, manufacturing, and trade centers beyond, such as Green Bay, Oshkosh, Madison, Milwaukee, and Chicago. These important highway connections ultimately provide economic links to national and international markets.

Transportation Demand/Economic Development

WIS 23 provides a connection to many economic sectors such as manufacturing, tourism, recreation, agriculture, and trade. As a two-lane highway facility, WIS 23 will not meet the standards for this type of rural highway as traffic increases.

Variable speeds increase travel time, and traffic hazards contribute to higher transportation costs for commuters and truck traffic. Increased travel costs for trucking companies and for businesses shipping and receiving products can result in higher product costs. This makes local businesses less competitive and less likely to expand. The consumer may also see higher product prices. Increased travel times may prevent extension of local business customer service and supply areas. Approximately 30 percent of the existing highway is marked for no passing in Fond du Lac County and 60 percent in Sheboygan County. The existing two-lane highway hinders passing capabilities for all vehicles with a resulting increase in travel time.

Highway improvements that lower transportation costs and increase accessibility can create a positive perception of the region as a place to do business and enhance economic development. Certain industries may be attracted to the corridor area because of improved access to population centers, suppliers or buyers. Conversely, failing to improve the existing deficient access conditions may prevent new business attraction and employment opportunities.

Improved travel to recreational facilities will benefit tourism in east-central Wisconsin recreational areas through reduced travel time, increased safety and more relaxed and predictable travel. Recreational destinations such as Elkhart Lake and the golf courses of Kohler have been significant in drawing local, state, national, and international visitors. Future international events at these venues will draw even more travelers to WIS 23.

Legislative and Transportation Planning History

In March 1989, WisDOT submitted to the Governor its Corridors 2020 Report describing proposed backbone and connector components of the state's highway system. The purpose of Corridors 2020 is to create a network of superior quality highways to foster economic development and meet intercity mobility needs into the 21st century. WIS 23 is identified in the Corridors 2020 Plan as a connector route. (See Figure 2; page I-10 for a Corridors 2020 map.)

As a connector route, WIS 23 should be upgraded to the highest quality standards of roadway width, passing opportunities and alignment. An improved WIS 23 that meets these standards will meet the transportation needs of east central Wisconsin and integrate its economy and communities with the rest of Wisconsin and the nation.

In August 1989, WisDOT adopted a statewide plan for mapping access on the state highway system. The purpose of the access plan is to provide a high level of service for through traffic while providing reasonable access to abutting properties. The plan identifies Corridor 2020 connector routes, like WIS 23, as highways for which managed access is essential for maintaining high levels of service.

In April 1991, a report entitled "Mobility 2000" was developed as a legislative amendment to the 1991-93 transportation budget. The report incorporates the recommendations made in the Corridors 2020 Plan. In general,

Mobility 2000 goes into more detail than the Corridors 2020 Plan on funding and other strategies for implementing the state's transportation program.

The Wisconsin State Legislature in the 1999 Biennial Budget enumerated WIS 23 as a major project. Expanding highway capacity along the portion of WIS 23 from WIS 67 to US 41 in Sheboygan and Fond du Lac Counties is found in Wis. Stats 84.013 (ra).

Existing and Future Traffic Volumes

For the purpose of the WIS 23 corridor study, traffic volumes are expressed as average daily traffic (ADT). The ADT volumes reflect average travel conditions on a particular highway rather than daily or seasonal variations. Existing traffic volumes were derived from WisDOT count data. Forecast volumes, developed by WisDOT's Traffic Forecasting Section in Madison, are based on WisDOT's historic counts and associated growth trends, and data from regional and local plans that include present and future land use and development trends, and demographic data such as changes in population and employment. Existing traffic of 2000 compared with forecast traffic for 2030 show how traffic is expected to increase over time without improvements

Traffic is steadily increasing along WIS 23. Latest (2000) traffic counts within the project limits range from 6300 vehicles per day to 13,600 vehicles per day. According to the WisDOT Facility Design Manual (FDM), when ADT exceeds 8700 vehicles per day, the desirable facility for a rural 2020-connector route highway is a four-lane facility. The projected 2030 traffic volumes range from 10,100 to 21,800 vehicles per day. Historical growth pattern percentages are added to the present day traffic counts to create a linear regression (line) from the past through the present and out into future design years. See Table I-1 below for 2001 traffic counts and 2030 projections.

Table I-1

EXISTING AND FORECASTED AVERAGE DAILY TRAFFIC No-Build Alternate		
LOCATION WIS 23 Between:	**LATEST COUNT 2000 ADT**	**2030(Design Year) NO BUILD**
County K / County UU	13,600	21,800
County UU / Taft Rd	8100	12,200
Tower Rd / Poplar Rd	7800	12,500
Town Line Rd / Hinn Rd	8100	13,200
Hinn Rd / Loehr Rd	6800	13,000
Banner Rd / Triple T rd	6800	10,800
Hickory Rd / County G	6800	10,500
County G / Division Rd	6400	10,100
Spring Valley Rd / County T	6300	10,400
County S / County P	8800	14,600
County P / Branch Rd	10,000	16,600

Based on the above statistics from 2000, highway capacity expansion on WIS 23 is nearly at the levels needed for improvements along the existing route. As traffic volumes increase to those forecasted for the design year 2030, the two-lane roadway geometrics will become more critical in obstructing smooth and safe traffic flow.

Currently, WIS 23 exhibits adequate physical characteristics compared to standards for two-lane rural state trunk highways. Heavy truck traffic volumes and 235 access points hinder the operational characteristics of WIS 23. The daily truck traffic is at 13.9 percent of the total traffic of WIS 23, which on two-lane roadways is particularly detrimental to roadway operational characteristics because passing requires use of the opposing traffic lane. The truck traffic imposes a direct limitation on the overall capacity of the existing road with the inability to pass, creating conflicts with slower local traffic, recreational vehicles, vehicles towing trailers, and farm machinery.

This mixture of traffic can impede traffic flow creating unsafe situations and lowers the efficiency of the roadway. The existing two-lane roadway geometrics and access control are inadequate for the current and projected volumes of traffic.

Traffic along the existing route is a combination of local and through traffic. Local traffic has origins and/or destinations within the municipalities of Plymouth and Fond du Lac, as well as along the corridor. The through traffic is classified as traffic not having either origins or destinations within these municipalities.

Currently, there is high crossroad traffic at County K in the City of Fond du Lac, exceeding 5300 ADT. In addition, the intersections of WIS 23 at County UU, County W, and County G in Fond du Lac County exceed 2000 ADT. This heavy cross traffic impedes WIS 23 and reduces overall capacity. The Corridor 2020 report provides guidance that an interchange warrants consideration when the design year mainline and side road combined ADT > 12,000 and the side road traffic ADT > 2,000.

In 1997, the WisDOT conducted origin/destination (OD) surveys in the Fond du Lac area. Approximately 43 percent of all the vehicles were through trips (beyond the City of Fond du Lac) and 58 percent of the truck traffic was through trips.

Roadway level of service (LOS) is a measure of a highway's capacity to serve the traffic demands placed on it. Traffic and roadway design factors such as ADT volumes, peak hour volumes, truck percentages, number of driving lanes, lane widths, vertical grades, passing opportunities, and numbers of access points affect the level of service. LOS ranges from "A" to "F" in order of decreasing operational quality. Table I-2 below shows the LOS along WIS 23 and Table I-3 describes the characteristics of those levels.

As a Corridors 2020 connector route, WIS 23 does not meet the high quality standards of roadway width, passing opportunities and alignment of a connector route. Steadily increasing traffic volumes and numerous access points has decreased the mobility and efficiency of the existing highway. Current and projected traffic volumes, truck percentages and traffic operations on WIS 23 point to the inadequacies of the existing two-lane roadway. Vehicle capacity on WIS 23 will continue to decrease if improvements are not made on the highway.

Table I-2

Highway Capacity Analysis Results						
WIS 23 Segment	Segment Length In Miles	Percent No Passing	Existing Level of Service 2001	Future (2030) LOS No-Build	Future (2030) LOS PASSING LANES	Future (2030) LOS FOUR LANES
County K to County UU	1.3	44	LOS D	LOS E	N/A	LOS B
County UU to County W	5.5	19	LOS C	LOS D	LOS D	LOS A
County W to County T	8.0	26	LOS C	LOS D	LOS D	LOS A
County T to County P	4.3	13	LOS C	LOS D	LOS D	LOS A

Table I-3

Level of Service Characteristics	
Desirable	
A	Unrestricted free flow. Drivers virtually unaffected by others. High level of freedom to select speed and maneuver. Excellent level of driver comfort and convenience.
B	Slightly restricted stable flow. Drivers aware of use by others. Slight restriction in speed and maneuvering. Good level of driver comfort and convenience.
C	Moderately restricted stable flow. Driver operation completely affected by others. Moderate restriction in speed and maneuvering. Fair level of comfort and convenience.
Undesirable	
D	Heavily restricted flow. Driver operation completely affected by others. Severe restriction in speed and maneuvering. Poor level of driver comfort and convenience.
E	Unstable flow (approach greater than discharge flow) Slow speeds and traffic backups; some stoppage. Total restriction in vehicle maneuvering. High driver frustration.
F	Forced flow (approach greater than discharge flow) Stop and go movements with long backups and delays. Forced vehicle maneuvers. Maximum driver frustration.

Existing Highway Characteristics

Roadway factors, such as type of facility, lane widths, shoulder widths, lateral clearances, and horizontal and vertical alignments, influence the capacity of the road. These factors are discussed below.

Typical Sections

Existing WIS 23 is a two-lane rural roadway with bituminous pavement. While the physical characteristics of the existing highway are adequate for a two-lane facility, traffic volumes warrant a multi-lane facility to meet current and future capacity needs. When the average daily traffic (ADT) exceeds 8700, the desirable standard for rural 2020-connector route is a four-lane facility. The existing average weighted ADT for WIS 23 within the project limits is 8150.

Horizontal and Vertical Geometrics

Although the horizontal and vertical geometrics are within WisDOT standards, the locations of side road and access points intersect many of the curves in less than optimal locations. These poor geometrics contribute to the above average fatality rate of 2.25 deaths per 100 million vehicle miles driven, compared with the state average rate of 1.725. The crash rate is 72 crashes per 100 million vehicle miles, whereas the state rate is 122.

The less than desirable horizontal and vertical curves, in combination with the existing terrain contribute to approximately 43 percent (average) no passing zones. Traffic volumes often prevent passing opportunities on the

remaining roadway. The inability to pass restricts speed and maneuverability for through-traffic and may lead to driver frustration and inconvenience.

Access

In August of 1989, WisDOT adopted a statewide plan for managing access on the state highway system. The purpose of the access plan is to provide a high level of service for through traffic while providing reasonable access to abutting properties. The plan's goal is to seek a balance between public investments in highway improvements and the desire for land development, tax base growth and job creation. The plan identifies Corridors 2020 routes, like WIS 23, as a group of highways for which managed access is deemed essential to maintaining a required high level of service.

Driveways from residential and a few commercial properties are located along the entire 19-mile route. There are 235 access points within the project limits, which are summarized in the Table I-4 below. These access points, in combination with traffic volumes, contribute to congestion and hazardous driving conditions. Guidelines for an expressway facility recommend at least 1000 feet of space between access points. The current access point spacing is less than 600 feet. Vehicles entering and exiting WIS 23 at numerous access points interrupt the flow of traffic. Drivers adjust their travel speed not only to accommodate entering and exiting vehicles, but also due to the very presence of the access points. The combination of 235 access points and high traffic volumes also contributes to a high crash rate potential.

Table I-4

EXISTING ACCESS SUMMARY	
Access Type	Number of Access Points
State Trunk Highways	0
County Trunk Highways	16
Local Roads and Streets	51
Commercial, Residential Driveways	95
Field Entrances	73
TOTAL	**235**

Safety

A crash study report was prepared for WIS 23 between County K and County P. Crashes from 1994 to 2001 have been analyzed. A total of 314 crashes occurred during the eight-year study period. Crash rates are compared to Statewide Average Crash Rates for rural state trunk highways. Table I-5 below summarizes rural crashes, from County K to County P.

Table I-5

SUMMARY OF RURAL HIGHWAY 23 CRASHES NOT INCLUDING DEER						
	Fatal Crash Rate		**Injury Crash Rate**		**Property Damage Crash Rate**	
Year	WIS 23	STATE	WIS 23	STATE	WIS 23	STATE
1994	0	1.8	22	54	47	84
1995	2	1.8	31	52	26	82
1996	2	1.9	40	53	42	77
1997	4	1.7	29	49	26	71
1998	4	1.6	38	47	32	62
1999	2	1.7	25	47	49	65
2000	2	1.8	41	47	34	69
2001	2	1.5	38	42	37	60
TOTAL	18	13.8	262	391	296	570
Avg	**2.25**	**1.725**	**33**	**49**	**37**	**71**
Crash rates are expressed as the number of crashes per 100 million vehicle miles.						

Deer crashes contributed to an additional 44 percent of the rural crashes. Common types of crashes in rural areas included: run-off-the-road at 11 percent, rear end crashes at 7.7 percent, and sideswipes at 18.6 percent.

While the WIS 23 crash rates within the project limits are less than the statewide rates, the fatal crash rate of 2.25 is 23 percent higher than the statewide rate of 1.725. The WIS 23 crash rate is expected to increase as the traffic increases along the existing road. Crashes will increase at side roads, driveways and access points as congestion increases at these points.

SUMMARY OF PURPOSE AND NEED

Existing WIS 23 is a major connector between the City of Fond du Lac and the City of Sheboygan and the only major east west connecting highway between these and other population centers of east-central Wisconsin. It is provides a major link between I-43 and US 41.

WIS 23 is a designated state long truck route. It is a vital interregional connector and part of the Corridors 2020 Plan as a connector route. As a connector route, it should be upgraded to the highest quality standards of roadway width, passing opportunities and alignment.

Currently, WIS 23 exhibits adequate physical characteristics compared to standards for rural state trunk highways. Heavy traffic volumes, including through traffic and truck traffic conflicting with slower local traffic and farm machinery, impede the operational characteristics of WIS 23. Local traffic and farm machinery enters and exits the highway from approximately 235 local roads, private driveways and field access points.

Even with existing traffic volumes, poor traffic characteristics and existing two-way roadway geometrics result in dangerous conflict points on WIS 23. The crash rate is expected to increase with the increased traffic. This EIS will analyze the alternative corridor highway types considered for this highway improvement project and addresses the identified needs. Findings from the study will determine the corridor preservation plan for the future of WIS 23.

STH 23 LOCATION MAP

The STH 23 corridor plan study area is shown in figure 1. The corridor planning study area is one mile north and south of the highway from USH 41 to I-43. The EIS termini are CTH K in Fond du Lac County and CTH P in Sheboygan County. The corridor plan study area is larger than the EIS study area to capture the system perspective.

Figure 1. STH 23 Corridor Plan Study Area

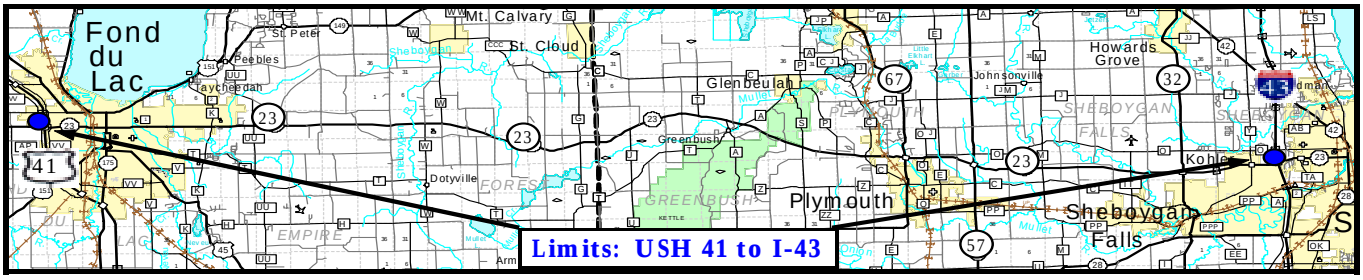
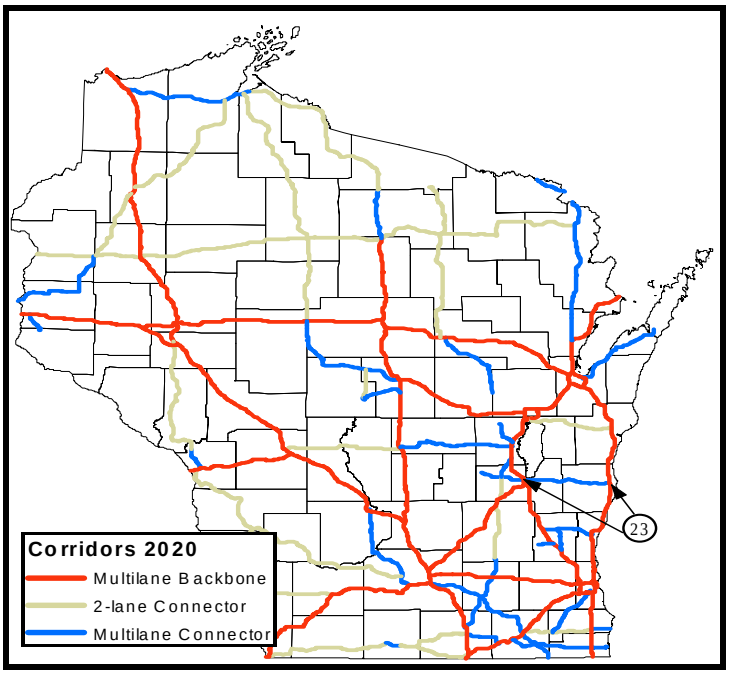


Figure 2. Corridors 2020 Network



STH 23 has a continual level of functional continuity from USH 41 to I-43. This segment of STH 23 is also bordered by a multilane backbone route on each end. The corridor segment for STH 23 is shown as a future multilane connector on the Corridors 2020 Network. Figure 2 shows the Corridors 2020 network.